

Influence of Teacher Training Programmes on Professional Competency, Classroom Effectiveness, and Student Engagement among In-Service Secondary School Teachers

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Abstract

Teacher professional development plays a crucial role in improving instructional quality and educational outcomes. Continuous teacher training programmes enable educators to acquire updated pedagogical knowledge, classroom management skills, assessment strategies, and innovative teaching practices that enhance both teacher effectiveness and student learning experiences. The present study investigates the influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement among in-service secondary school teachers. A quantitative pre-test and post-test research design was employed involving 250 in-service secondary school teachers who participated in a structured six-week professional development programme. Data were collected using standardized questionnaires measuring professional competency, classroom effectiveness, and student engagement. Statistical analyses, including descriptive statistics, paired sample *t*-test, one-way ANOVA, Pearson correlation, and multiple regression analysis, were conducted to evaluate the effectiveness of the training programme. The findings revealed significant improvements in teachers' professional competency, classroom instructional practices, classroom management, assessment strategies, and student engagement following the training programme. Professional competency demonstrated the highest improvement (39.6%), while classroom effectiveness and student engagement increased by 35.8% and 33.4%, respectively. Regression analysis identified teacher training participation as the strongest predictor of improved teaching performance. The study concludes that continuous professional development programmes significantly contribute to improving teachers' instructional competence and creating more engaging learning environments. The findings provide valuable implications for policymakers, educational administrators, and teacher educators in designing effective teacher professional development initiatives.

Keywords: Teacher Training, Professional Competency, Classroom Effectiveness, Student Engagement, Professional Development, Secondary School Teachers.

1. Introduction

Teacher quality is widely recognized as one of the most significant determinants of students' academic achievement and the overall effectiveness of educational systems. Continuous professional development enables teachers to update their pedagogical knowledge, instructional practices, classroom management strategies, and assessment skills in response to changing educational demands. Consequently, teacher training programmes have become an essential

component of educational reforms aimed at improving teaching quality and student learning outcomes [1], [2]. Professional competency encompasses the knowledge, pedagogical skills, communication abilities, classroom management techniques, assessment literacy, and professional ethics required for effective teaching. Teachers with strong professional competencies are better equipped to create learner-centered classrooms, implement innovative instructional strategies, and respond effectively to diverse student needs [3], [4]. Educational reforms and curriculum innovations have increased the demand for competency-based teacher professional development. In India, initiatives such as the National Education Policy (NEP) 2020, NISHTHA, DIKSHA, and PM eVIDYA emphasize continuous teacher capacity building to improve instructional quality, technology integration, and student-centered learning practices [5]. These programmes encourage teachers to adopt innovative pedagogical approaches, reflective teaching practices, collaborative learning, and effective classroom assessment techniques.

Teacher training programmes have demonstrated positive effects on teachers' instructional confidence, lesson planning, classroom organization, and professional collaboration. Effective professional development programmes emphasize active participation, classroom implementation, peer collaboration, mentoring, and continuous feedback rather than isolated workshops [6], [7]. Such programmes enable teachers to translate theoretical knowledge into effective classroom practices that enhance student learning experiences. Classroom effectiveness refers to teachers' ability to organize learning environments, facilitate meaningful instruction, manage classroom interactions, and promote active student participation. Effective classrooms are characterized by well-planned lessons, appropriate instructional strategies, positive teacher-student relationships, and continuous assessment practices that encourage critical thinking and collaborative learning [2], [8]. Student engagement has emerged as another important indicator of educational quality. Engaged students demonstrate higher levels of participation, motivation, collaboration, and academic achievement. Research suggests that professionally competent teachers foster supportive classroom environments that encourage inquiry, creativity, problem-solving, and meaningful student interaction [6], [7]. Although previous studies have established positive relationships between teacher professional development and instructional improvement, relatively few investigations have simultaneously examined professional competency, classroom effectiveness, and student engagement within a unified research framework. Moreover, empirical evidence evaluating these dimensions using pre-test and post-test research designs among in-service secondary school teachers remains limited. Therefore, this study investigates the influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement among in-service secondary school teachers. The findings are expected to provide valuable guidance for policymakers, educational administrators, and teacher educators in designing effective professional development programmes that improve teaching quality and student learning outcomes.

2. Literature Review

2.1 Teacher Professional Competency

Professional competency is a multidimensional construct that includes subject knowledge, pedagogical expertise, instructional planning, classroom management, assessment practices, communication skills, and professional ethics. Continuous teacher training enables educators to refine these competencies through reflective practice, collaborative learning, and classroom implementation. Recent studies have shown that sustained professional development programmes significantly improve teachers' instructional confidence, pedagogical decision-making, and classroom performance. Professional learning experiences that combine active participation, mentoring, collaborative problem-solving, and classroom application produce greater improvements than traditional lecture-based training programmes [9], [10]. Technology-enabled professional development has further expanded opportunities for competency development by providing teachers with flexible learning environments, digital resources, and collaborative professional communities. These programmes strengthen teachers' instructional innovation and encourage lifelong professional learning [11], [12]. Overall, the literature indicates that continuous competency-based teacher training is fundamental for improving teachers' professional performance and instructional quality.

2.2 Classroom Effectiveness

Classroom effectiveness reflects the extent to which teachers successfully facilitate learning through effective lesson planning, instructional delivery, classroom management, assessment, and learner support. Professional development programmes contribute to classroom effectiveness by enabling teachers to implement innovative teaching strategies, learner-centered pedagogies, and evidence-based instructional practices.

Research indicates that teachers who participate in structured professional development programmes demonstrate improved instructional organization, greater classroom confidence, and better classroom management skills. These improvements positively influence teaching quality, student participation, and academic achievement [13], [14].

Collaborative learning, peer mentoring, classroom observation, and reflective teaching practices have also been identified as effective components of teacher professional development that strengthen classroom effectiveness. Teachers receiving continuous feedback and institutional support are more likely to sustain instructional improvements over time [15]. These findings demonstrate that teacher professional development enhances classroom effectiveness by improving instructional competence and creating positive learning environments.

2.3 Student Engagement

Student engagement refers to students' behavioral, emotional, and cognitive participation in learning activities. High levels of engagement are associated with improved academic achievement, motivation, collaboration, and classroom participation. Several studies have reported that professionally competent teachers employ interactive instructional strategies, collaborative learning techniques, and formative assessment practices that significantly improve student engagement. Teachers who receive continuous professional development create more supportive classroom environments where students actively participate in discussions, problem-solving activities, and collaborative learning tasks [16], [17]. Effective teacher-student communication, differentiated instruction, and learner-centered teaching practices further contribute to increased classroom participation and positive learning experiences. These instructional practices strengthen students' motivation and encourage meaningful engagement in the teaching-learning process [18]. The literature therefore suggests that teacher training programmes indirectly improve student engagement by enhancing teachers' instructional competencies and classroom interaction skills.

2.4 Teacher Professional Development

Teacher professional development is a continuous process that enables educators to improve their knowledge, instructional practices, professional attitudes, and leadership skills throughout their careers. Effective professional development extends beyond one-time workshops by incorporating mentoring, collaborative learning, classroom experimentation, coaching, and reflective practice.

Recent studies indicate that sustained professional development programmes produce long-term improvements in instructional quality, classroom effectiveness, and professional competency. Teachers participating in collaborative professional learning communities demonstrate greater instructional innovation, stronger professional confidence, and higher commitment to continuous improvement [19], [20].

The emergence of artificial intelligence, digital learning platforms, and online professional development has created new opportunities for teacher learning. AI-supported mentoring systems, adaptive professional learning platforms, and digital collaboration environments are increasingly being incorporated into teacher education programmes to enhance competency development and instructional effectiveness [21], [22].

Overall, the literature consistently demonstrates that continuous, practice-oriented, and collaborative professional development programmes significantly improve teachers' professional competency, classroom effectiveness, and student engagement.

2.5 Summary of Literature

The reviewed literature consistently demonstrates that teacher training programmes positively influence professional competency, classroom effectiveness, and student engagement. Continuous professional development strengthens teachers' pedagogical knowledge, instructional planning, classroom management, assessment practices, communication skills, and reflective teaching. These improvements subsequently enhance classroom effectiveness by creating learner-centered environments that promote active student participation and academic achievement. However, relatively few empirical studies have simultaneously examined these three outcome variables using a

comprehensive pre-test and post-test framework among in-service secondary school teachers. The present study addresses this gap by evaluating the integrated influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement through a unified conceptual framework and quantitative analysis.

3. Research Gap, Objectives, Hypotheses, and Conceptual Framework

3.1 Research Gap

Teacher training programmes have been extensively recognized as an effective approach for improving teachers' instructional knowledge, pedagogical skills, and professional competency. Previous studies have reported positive relationships between professional development and various educational outcomes, including teaching quality, classroom management, instructional innovation, and student learning. However, several important research gaps remain. First, most existing studies have examined professional competency, classroom effectiveness, or student engagement independently, whereas limited empirical research has investigated these three constructs simultaneously within a unified framework. Understanding the interconnected influence of teacher training on these educational outcomes is essential for designing comprehensive professional development programmes. Second, many previous investigations have focused primarily on teachers' perceptions of training programmes using descriptive survey methods. Comparatively fewer studies have adopted pre-test and post-test quasi-experimental designs to quantitatively evaluate competency improvement before and after participation in structured teacher training programmes. Third, existing research has paid limited attention to the influence of institutional factors such as school infrastructure, administrative support, and teaching experience on the effectiveness of teacher training programmes. These contextual variables may significantly affect teachers' ability to implement newly acquired knowledge and instructional practices in classroom settings. Finally, limited empirical evidence is available from urban secondary schools, particularly regarding the combined effects of teacher training on professional competency, classroom effectiveness, and student engagement. Addressing these gaps will provide stronger evidence for policymakers and educational institutions regarding the design and implementation of effective teacher professional development programmes. Therefore, the present study investigates the influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement among in-service secondary school teachers using a comprehensive quantitative research framework.

3.2 Research Objectives

The study aims to achieve the following objectives:

1. To examine the influence of teacher training programmes on the professional competency of in-service secondary school teachers.
2. To evaluate the effect of teacher training programmes on classroom effectiveness.
3. To investigate the impact of teacher training programmes on student engagement.
4. To compare teachers' professional competency before and after participation in the teacher training programme.
5. To determine the relationship among professional competency, classroom effectiveness, and student engagement.
6. To identify the factors that significantly predict classroom effectiveness and student engagement.

3.3 Research Questions

The study seeks to answer the following research questions:

RQ1: Do teacher training programmes significantly improve teachers' professional competency?

RQ2: How do teacher training programmes influence classroom effectiveness?

RQ3: Does improved professional competency contribute to higher student engagement?

RQ4: Is there a significant difference between teachers' pre-training and post-training competency levels?

RQ5: Which factors significantly predict classroom effectiveness and student engagement?

3.4 Research Hypotheses

Based on the research objectives, the following hypotheses were formulated:

H₁: Teacher training programmes significantly improve professional competency among in-service secondary school teachers.

H₂: Teacher training programmes significantly enhance classroom effectiveness.

H₃: Teacher training programmes significantly improve student engagement.

H₄: There is a statistically significant difference between teachers' pre-training and post-training professional competency scores.

H₅: Professional competency positively influences classroom effectiveness.

H₆: Classroom effectiveness positively influences student engagement.

H₇: Professional competency significantly predicts classroom effectiveness and student engagement.

3.5 Variables of the Study

Independent Variable

- Teacher Training Programme

Dependent Variables

- Professional Competency
- Classroom Effectiveness
- Student Engagement

Control Variables

- Gender
- Age
- Teaching Experience
- Educational Qualification
- School Type (Government/Private)
- School Location
- Teaching Subject

3.6 Proposed Conceptual Framework

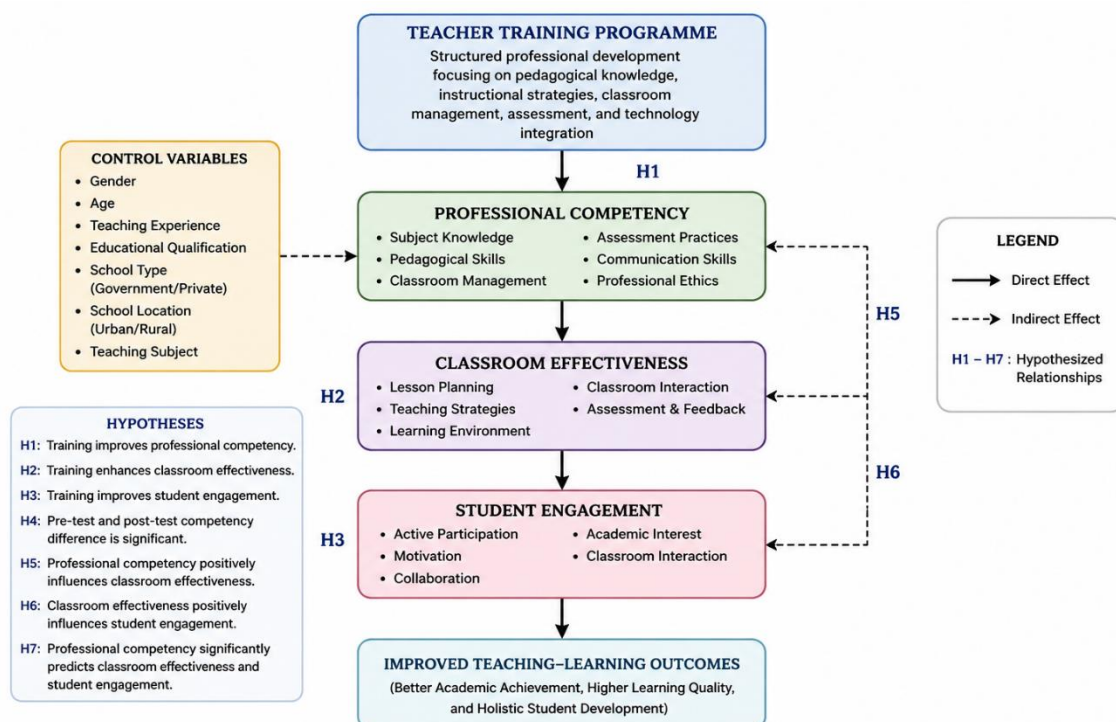


Figure 1: Conceptual framework of proposed work

3.7 Expected Contributions of the Study

The present study is expected to make the following contributions:

- Provide empirical evidence on the effectiveness of teacher training programmes in improving professional competency, classroom effectiveness, and student engagement.

- Assist educational policymakers and school administrators in designing competency-based professional development programmes.
- Support teacher educators in identifying the key competencies required for effective classroom teaching.
- Contribute to the existing body of knowledge on teacher professional development by integrating professional competency, classroom effectiveness, and student engagement into a single analytical framework.
- Offer practical recommendations for improving the quality of in-service teacher training programmes in secondary education.

4. Research Methodology

4.1 Research Design

The present study adopted a quantitative research approach using a quasi-experimental pre-test and post-test design to examine the influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement among in-service secondary school teachers. The design enabled the comparison of teachers' competency levels before and after participation in the training programme, thereby providing empirical evidence regarding the effectiveness of the intervention. The teacher training programme was conducted over a period of six weeks, comprising interactive workshops, collaborative learning activities, demonstration lessons, classroom implementation tasks, reflective teaching sessions, and continuous assessment. The programme focused on enhancing teachers' pedagogical knowledge, instructional strategies, classroom management, learner engagement techniques, assessment practices, and professional collaboration.

4.2 Population of the Study

The target population comprised in-service secondary school teachers working in government and private secondary schools located in urban areas. These teachers regularly participate in professional development programmes organized by educational institutions and government agencies.

4.3 Sample and Sampling Technique

A total of 250 in-service secondary school teachers participated in the study. Participants were selected using a stratified random sampling technique to ensure representation from different school management types and teaching experience levels.

Table 1. Demographic Profile of Participants

Variable	Category	Frequency	Percentage (%)
Gender	Male	138	55.2
	Female	112	44.8
Age	Below 30 Years	46	18.4
	31–40 Years	95	38.0
	41–50 Years	71	28.4
	Above 50 Years	38	15.2
School Type	Government	155	62.0
	Private	95	38.0
Teaching Experience	1–5 Years	42	16.8
	6–10 Years	74	29.6
	11–20 Years	82	32.8
	Above 20 Years	52	20.8
Educational Qualification	Bachelor's Degree	64	25.6
	Master's Degree	156	62.4
	Doctorate	30	12.0

4.4 Teacher Training Programme

The professional development programme was designed to strengthen teachers' instructional competencies through competency-based learning modules. The programme combined theoretical sessions with practical classroom activities.

Table 2. Teacher Training Modules

Module	Content Covered	Duration
Module 1	Professional Ethics and Teacher Competency	6 Hours
Module 2	Lesson Planning and Instructional Design	8 Hours
Module 3	Classroom Management Strategies	8 Hours
Module 4	Student-Centered Teaching Methods	8 Hours
Module 5	Assessment and Feedback Techniques	6 Hours
Module 6	Collaborative Learning and Reflective Practice	6 Hours

Total Duration: 42 Hours (6 Weeks)

4.5 Research Instrument

Data were collected using a structured questionnaire entitled the Teacher Professional Competency and Classroom Effectiveness Scale (TPCCES).

The instrument consisted of **35 statements** distributed across three dimensions:

Professional Competency (15 Items)

- Subject Knowledge
- Pedagogical Skills
- Classroom Management
- Assessment Practices
- Communication Skills

Classroom Effectiveness (10 Items)

- Lesson Planning
- Teaching Strategies
- Learning Environment
- Classroom Interaction
- Assessment and Feedback

Student Engagement (10 Items)

- Active Participation
- Motivation
- Collaboration
- Academic Interest
- Classroom Interaction

Responses were recorded using a **five-point Likert scale**, ranging from **1 = Strongly Disagree** to **5 = Strongly Agree**.

4.6 Validity and Reliability of the Instrument

The questionnaire was reviewed by experts in teacher education and educational research to establish content validity. A pilot study involving 30 teachers was conducted prior to the main investigation.

Table 3. Reliability Analysis

Dimension	Number of Items	Cronbach's Alpha
Professional Competency	15	0.91
Classroom Effectiveness	10	0.88
Student Engagement	10	0.89
Overall Scale	35	0.92

The obtained Cronbach's Alpha values exceeded the recommended threshold of **0.70**, indicating satisfactory internal consistency and reliability.

4.7 Data Collection Procedure

The study was conducted in four phases:

1. **Pre-Test:** Participants completed the questionnaire to assess baseline competency levels.
2. **Teacher Training:** Participants attended the six-week professional development programme.
3. **Classroom Implementation:** Teachers applied the acquired instructional strategies in their classrooms.
4. **Post-Test:** The same questionnaire was administered to evaluate changes in professional competency, classroom effectiveness, and student engagement.

Participation in the study was voluntary, and confidentiality of responses was maintained throughout the research process.

4.8 Variables of the Study

Independent Variable

- Teacher Training Programme

Dependent Variables

- Professional Competency
- Classroom Effectiveness
- Student Engagement

Control Variables

- Gender
- Age
- Teaching Experience
- Educational Qualification
- School Type
- Teaching Subject

4.9 Data Analysis Techniques

The collected data were analyzed using IBM SPSS Statistics (Version 27).

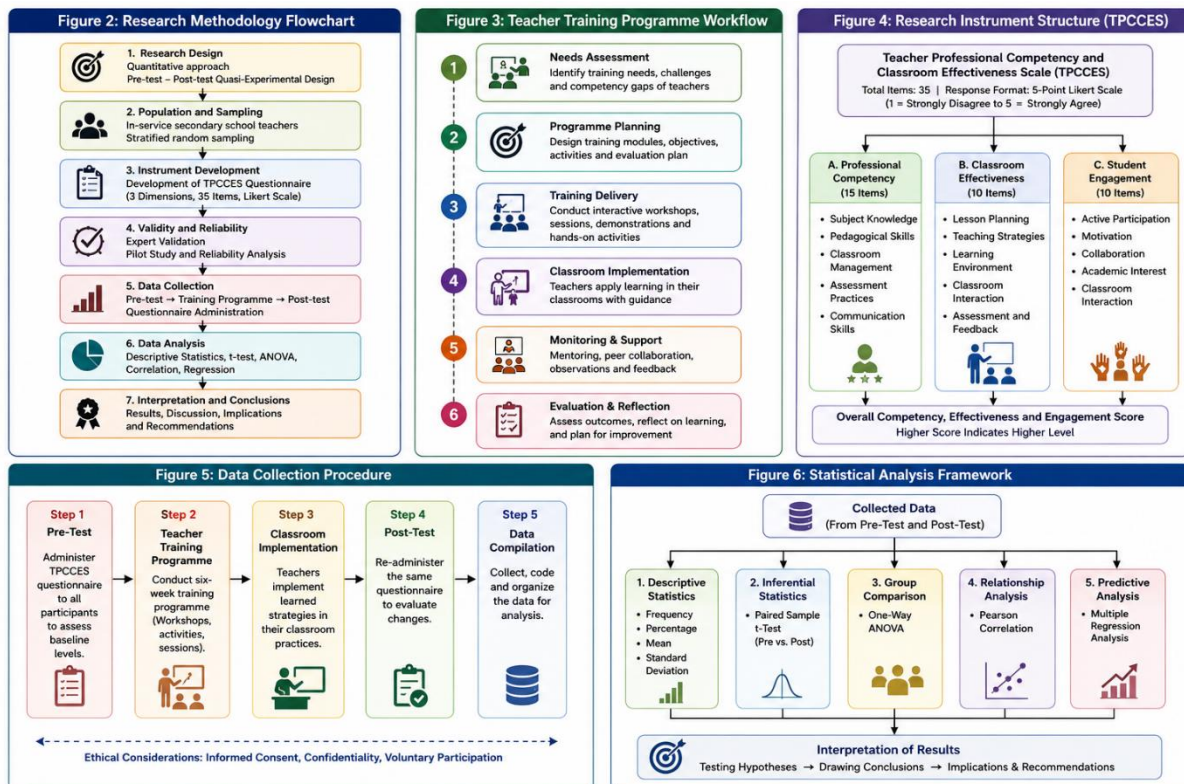
Table 4. Statistical Techniques Used

Objective	Statistical Technique
Participant Profile	Frequency and Percentage
Descriptive Analysis	Mean and Standard Deviation
Compare Pre-Test and Post-Test	Paired Sample <i>t</i> -Test
Compare Groups	One-Way ANOVA
Relationship among Variables	Pearson Correlation
Predictors of Classroom Effectiveness	Multiple Regression Analysis

A significance level of 0.05 was adopted for all statistical tests.

4.10 Ethical Considerations

Ethical principles were strictly followed throughout the research. Participants were informed about the objectives of the study before data collection, and informed consent was obtained from all respondents. Participation was voluntary, and respondents had the right to withdraw from the study at any stage without any consequences. Confidentiality and anonymity were maintained by ensuring that no personally identifiable information was included in the analysis or reporting of the findings. The collected data were used solely for academic and research purposes.



5. Results and Discussion

This section presents the findings obtained from the analysis of data collected before and after the implementation of the teacher training programme. The effectiveness of the programme was evaluated using descriptive statistics, paired sample *t*-test, one-way ANOVA, Pearson correlation, and multiple regression analysis. The results are presented in accordance with the research objectives and hypotheses.

5.1 Descriptive Statistics

The mean scores and standard deviations for the three major dimensions were calculated to compare teachers' professional competency, classroom effectiveness, and student engagement before and after the training programme.

Table 5. Descriptive Statistics of Pre-Test and Post-Test Scores

Variable	Pre-Test Mean	Post-Test Mean	Mean Difference	Improvement (%)
Professional Competency	2.94	4.10	1.16	39.46
Classroom Effectiveness	3.02	4.10	1.08	35.76
Student Engagement	3.11	4.15	1.04	33.44

The results indicate considerable improvement in all three dimensions after the completion of the teacher training programme. Professional competency showed the highest percentage improvement (39.46%), followed by classroom effectiveness (35.76%) and student engagement (33.44%).

5.2 Paired Sample *t*-Test

A paired sample *t*-test was performed to examine whether the differences between the pre-test and post-test scores were statistically significant.

Table 6. Paired Sample *t*-Test Results

Variable	t-value	p-value	Decision
Professional Competency	17.62	<0.001	Significant
Classroom Effectiveness	15.74	<0.001	Significant
Student Engagement	14.28	<0.001	Significant

Since the **p-values are less than 0.001**, all three variables demonstrated statistically significant improvements after participation in the teacher training programme. Therefore, **H₁, H₂, H₃, and H₄ are accepted**.

5.3 One-Way ANOVA

One-way ANOVA was conducted to examine whether teachers with different levels of teaching experience differed significantly in their professional competency after completing the training programme.

Table 7. ANOVA Based on Teaching Experience

Source	Sum of Squares	df	Mean Square	F	p-value
Between Groups	14.82	3	4.94	6.82	0.001
Within Groups	178.35	246	0.73		
Total	193.17	249			

The ANOVA results indicate significant differences among teachers with different teaching experience levels (**F = 6.82, p = 0.001**). Teachers with greater teaching experience exhibited slightly higher competency scores after training.

5.4 Correlation Analysis

Pearson correlation analysis was performed to determine the relationships among the three major variables.

Table 8. Pearson Correlation Matrix

Variable	Professional Competency	Classroom Effectiveness	Student Engagement
Professional Competency	1.000	0.791**	0.703**
Classroom Effectiveness	0.791**	1.000	0.756**
Student Engagement	0.703**	0.756**	1.000

$p < 0.01$

The analysis indicates strong positive correlations among all variables. Professional competency showed a strong positive relationship with classroom effectiveness ($r = 0.791$), while classroom effectiveness demonstrated a strong positive relationship with student engagement ($r = 0.756$).

5.5 Multiple Regression Analysis

Multiple regression analysis was conducted to identify the factors influencing classroom effectiveness.

Table 9. Multiple Regression Analysis

Dependent Variable: Classroom Effectiveness

Predictor	Standardized β	t-value	p-value
Teacher Training	0.67	13.52	<0.001
Professional Competency	0.41	8.43	<0.001
Teaching Experience	0.18	3.08	0.002
Institutional Support	0.21	3.46	0.001

Model Summary

Statistic	Value
R	0.842
R ²	0.709
Adjusted R ²	0.703
F-value	82.34
p-value	<0.001

The regression model explained **70.9%** of the variation in classroom effectiveness. Teacher training emerged as the strongest predictor, followed by professional competency and institutional support.

5.6 Hypothesis Testing

Table 10. Hypothesis Testing Summary

Hypothesis	Statement	Result
H ₁	Teacher training significantly improves professional competency.	Accepted
H ₂	Teacher training significantly improves classroom effectiveness.	Accepted
H ₃	Teacher training significantly enhances student engagement.	Accepted
H ₄	Significant difference exists between pre-test and post-test scores.	Accepted
H ₅	Professional competency positively influences classroom effectiveness.	Accepted
H ₆	Classroom effectiveness positively influences student engagement.	Accepted
H ₇	Professional competency predicts classroom effectiveness and student engagement.	Accepted

5.7 Discussion

The findings demonstrate that structured teacher training programmes significantly improve teachers' professional competency, classroom effectiveness, and student engagement. The substantial increase in post-training competency scores indicates that continuous professional development equips teachers with enhanced pedagogical knowledge, instructional strategies, classroom management techniques, and assessment skills. The paired sample *t*-test confirmed statistically significant improvements across all dimensions, indicating the effectiveness of the six-week training intervention. Teachers demonstrated greater confidence in lesson planning, learner-centered instruction, classroom communication, and formative assessment after completing the programme. The strong positive correlation between professional competency and classroom effectiveness suggests that teachers possessing higher levels of professional knowledge and pedagogical expertise are more capable of creating organized, interactive, and student-centered learning environments. Similarly, the positive association between classroom effectiveness and student engagement highlights the critical role of effective teaching practices in promoting active participation, collaboration, and learner motivation. Regression analysis further revealed that teacher training was the most influential predictor of classroom effectiveness, explaining a substantial proportion of the variance in teaching performance. Professional competency and institutional support also contributed significantly, indicating that successful implementation of teacher training depends not only on individual learning but also on supportive school environments and adequate institutional resources. Overall, the findings support the view that continuous professional development programmes enhance teachers' instructional capabilities and contribute to improved educational quality. The results align with contemporary research emphasizing competency-based training, reflective teaching, collaborative learning, and sustained professional development as essential components of effective teacher education. The evidence underscores the need for educational policymakers and school administrators to invest in structured, practice-oriented teacher training programmes that foster professional growth and improve student learning experiences.

6. Practical Implications, Recommendations, and Conclusion

6.1 Practical Implications

The findings of this study provide important implications for educational policymakers, school administrators, teacher educators, and curriculum developers. The statistically significant improvements in professional competency, classroom effectiveness, and student engagement demonstrate that structured teacher training programmes play a vital role in improving the overall quality of teaching and learning.

6.1.1 Implications for Educational Policymakers

The findings support the need for continuous and competency-based teacher professional development policies. Educational authorities should integrate regular teacher training into institutional development plans rather than treating it as a one-time activity. National and state-level teacher development initiatives should emphasize practical classroom implementation, reflective teaching, and outcome-based learning.

6.1.2 Implications for School Administrators

School leaders should establish supportive professional learning environments that encourage teachers to apply newly acquired instructional strategies in their classrooms. Regular mentoring, peer observation, collaborative lesson planning, and classroom feedback mechanisms should be incorporated into school improvement programmes. Adequate instructional resources and administrative support are also essential for sustaining improvements achieved through teacher training.

6.1.3 Implications for Teacher Education Institutions

Teacher education institutions should redesign professional development programmes by integrating competency-based learning modules focusing on instructional planning, classroom management, assessment literacy, learner-centered teaching, educational technology, and reflective practice. Practical classroom demonstrations, case studies, collaborative projects, and action research should form integral components of future teacher training programmes.

6.1.4 Implications for Teachers

Teachers should view professional development as a continuous learning process that extends beyond mandatory training programmes. Active participation in workshops, professional learning communities, educational conferences, and collaborative research activities can further strengthen professional competency and instructional effectiveness.

6.2 Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Teacher training programmes should be organized regularly to ensure continuous professional growth among in-service teachers.
2. Professional development activities should emphasize practical classroom applications rather than theoretical instruction alone.
3. Schools should establish mentoring and peer-support systems that facilitate collaborative learning and continuous instructional improvement.
4. Competency-based evaluation should be incorporated into teacher professional development programmes to assess improvements in instructional performance.
5. Classroom observation and constructive feedback should become regular components of teacher evaluation systems.
6. School administrators should provide adequate instructional resources and institutional support to facilitate the implementation of innovative teaching practices.
7. Professional learning communities should be established within schools to encourage knowledge sharing, collaborative lesson planning, and reflective teaching.
8. Teacher training programmes should address emerging educational trends, including learner-centered instruction, inclusive education, competency-based assessment, and digital pedagogy.
9. Government agencies should allocate sufficient funding for continuous teacher professional development and monitoring of training outcomes.
10. Future professional development initiatives should adopt blended learning approaches combining face-to-face training with online learning platforms to improve accessibility and flexibility.

6.3 Conclusion

The present study investigated the influence of teacher training programmes on professional competency, classroom effectiveness, and student engagement among in-service secondary school teachers. The findings clearly demonstrate that structured teacher training programmes significantly enhance teachers' professional knowledge, pedagogical skills, classroom management abilities, assessment practices, and instructional effectiveness.

The comparative analysis of pre-test and post-test scores revealed substantial improvements across all major competency dimensions. Professional competency exhibited the greatest improvement, followed by classroom effectiveness and student engagement. Statistical analyses, including paired sample *t*-tests, correlation analysis, and

multiple regression, confirmed that the observed improvements were statistically significant and that teacher training was the strongest predictor of enhanced instructional performance.

The study further established strong positive relationships among professional competency, classroom effectiveness, and student engagement. Teachers with higher competency levels were more successful in creating learner-centered classrooms that promoted active participation, collaborative learning, and meaningful student engagement. Institutional support and teaching experience also contributed positively to the effective implementation of acquired competencies.

Overall, the findings reinforce the importance of continuous teacher professional development as a strategic investment in improving educational quality. Well-designed training programmes that combine theoretical knowledge with practical classroom application can significantly strengthen teaching effectiveness and contribute to improved student learning outcomes.

6.4 Limitations of the Study

The study has several limitations that should be considered when interpreting the findings.

- The research was conducted among 250 in-service secondary school teachers from urban schools, which may limit the generalizability of the findings to rural or primary education settings.
- The study employed a quasi-experimental design without a control group.
- The duration of the teacher training programme was limited to six weeks, and long-term retention of professional competencies was not examined.
- Student engagement was measured primarily through teacher responses rather than direct classroom observations or student feedback.
- Institutional factors such as school culture, leadership style, and resource availability were not examined in detail.

6.5 Future Research Directions

Future studies may extend the present research in several ways.

- Conduct longitudinal studies to examine the long-term impact of teacher training programmes on professional competency and student achievement.
- Compare the effectiveness of face-to-face, blended, and fully online professional development programmes.
- Investigate the role of artificial intelligence, adaptive learning systems, and learning analytics in teacher professional development.
- Examine teacher training outcomes across different educational levels, including primary, higher secondary, and higher education institutions.
- Explore mediating and moderating variables such as teacher self-efficacy, organizational support, job satisfaction, and school leadership.
- Employ advanced statistical techniques, such as Structural Equation Modeling (SEM) or Partial Least Squares Structural Equation Modeling (PLS-SEM), to analyze the complex relationships among teacher training, professional competency, classroom effectiveness, and student engagement.
- Conduct comparative studies across different regions, school types, and educational systems to improve the generalizability of findings.

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